



# ENGINEERING MAINTENANCE BRANCH BULLETIN

**Issue # 003**

**July 2005**

This is the third issue of what is a monthly bulletin to MSC ships and shoreside personnel. The purpose of the bulletin is to inform all concerned of current COMSC Preventive Maintenance management practices associated with any new or revised policy and procedures, along with helpful tips & tricks for improved maintenance. The bulletin will also discuss and present any upcoming initiatives in the various programs.

This month's Bulletin contains:

- *SAMM/Maintenance Tips*
- *PM Optimization – Making A Good Thing Better*
- *Question of the Month – SAMM Preventive Maintenance Estimated Man Hours*
- *Picture of the Month*
- *CMEO Training – Come & Get It!* **UPDATED!**
- *Now Hear This!*

## Keep Up to Date on the Engineering Maintenance Branch Website!

The Engineering Maintenance Branch website continues to be updated, along with some helpful downloads (SAMM, PENG, EASy overviews, OAS Guide, past issues of our bulletin, etc.). Check out (<http://www.msc.navy.mil/n7/engmgmt/engmgmt.htm>), for new, helpful updates!

## **WANTED... MORE PICTURES!!**

It is said, "A Picture's worth a thousand words." Let's prove it right.

If you have pictures of Shipboard Maintenance (Vibration testing, Oil Sampling, machinery upkeep, etc.) being performed, please send them (along with a *brief* narrative as to what the picture is) to Norm Wolf (e-mail: [Norman.wolf@navy.mil](mailto:Norman.wolf@navy.mil)). In the meantime, check out the picture submitted, later in this issue.

## SAMM/Maintenance Tips

### Export/Print 'One-Liner' Reports from SAMM (SP1 only):

1. Select the grid area data (any module) you wish to report on by using filtering capability.
2. Choose the dropdown arrow next to print and select 'Export Browse'
3. Select file name and location.

-Tip provided by Seaworthy Systems Incorporated (SSI)

### Lubrication Tip

Inclined or vertical shafts can lead to grease escaping from the bearing due to gravity. This will eventually lead to lubricant starvation and eventual premature failure of the bearing. Consider using grease with good adhesive properties of penetration Class 2 to 3. In addition a baffle plate, mounted in the housing below the bearing, will help to retain the grease where it is needed - in the bearing.

-Tip provided by Lube-Tips



# ENGINEERING MAINTENANCE BRANCH BULLETIN

## PM Optimization:

### Making A Good Thing Better

(by Randel Torfin, N711 Branch Chief)

#### BACKGROUND:

Over the past twenty years of the SAMM system, the complexity of MSC ships has changed but the SAMM maintenance philosophy has not changed to keep pace. The basic mission of Preventive Maintenance (PM) is to ensure “that the physical assets continue to do what the operators want them to do”. The established SAMM maintenance philosophy treated all equipment of a type (i.e. centrifugal pump) generically and not based on the function that the equipment provides. Predictive maintenance technology has been implemented into the fleet and applied to critical equipment, but the basic PM has not been reviewed based on the criticality or function of the each machine.

MSC Engineering in conjunction with Program Managers has started a process of PM Optimization (PMO) to review each ship’s maintenance plan. The ability to apply different levels of maintenance effort to different equipment based on its overall importance or criticality to the functioning of a ship is one the cornerstones of the PMO process. For example, a sea water pump on one ship may have more PM actions than the same model pump on another ship, if it is assessed that on the first ship the pump is of greater importance to the reliability of the first ships’ design function.

#### PROCESS:

Each piece of equipment on a ship is assigned a Critical Risk Factor (CRF). The CRF then determines the level of maintenance that should be assigned to that equipment. The CRF is calculated from the sum of five features of the equipment:

#### Mission and financial impact factor (weighting factor 3)

(Importance to the mission and financial impact from failure) (Example: Major –  $(3 * 3 = 9)$ )

3 – major;

2 – important;

1 - noteworthy

#### Operation factor

(Based on usage of the equipment, the relative rate in which wear will occur)

3 - must operate for system to achieve full capacity;

2 - operated on a rotation basis with other units;

1 - not required during normal vessel FOS operation

#### Redundancy factor

3 - single unit, system full load capable;

2 - multiple units, each less than system; full load capable;

1 - multiple units, each equal to, or greater than system full load

#### Safety and environmental impact factor

(weighting factor 3) Example: Detrimental –  $(2 * 3 = 6)$

3 – catastrophic;

2 – detrimental;

1 - minor

#### Environment factor

3 - uncontrolled ambient (i.e. On deck);

2 - controlled ambient (i.e. In Engine Room);

1- conditioned (i.e. In Control Room)

#### CRF GUIDELINES:

Based on the assigned CRFs, equipment are evaluated to 4 levels:

(9-14): **L1** = Minimal preventive maintenance applied. Life extension maintenance, if any, actions assigned. No data collected or trended. Repair as necessary.

(15-19): **L2** = Planned inspection and replenishment actions. No data collected or trended.

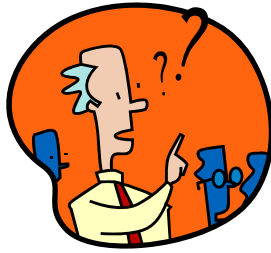
(20-23): **L3** = Planned replenishment action. Planned data collection. Planned non-intrusive checks. No planned inspection actions. Repair actions based on data analysis and trending. Additional replenishment actions based on data analysis and trending.

(24-27): **L4** = Planned repair, replenishment and data collection actions. Additional repair and replenishment actions based on data analysis and trending. Component monitoring based on single analysis.

The PMO process has started on the T-ATF, T-AO, T-AKR 310, T-AE, T-AOE and the T-AKR 300 Classes. By applying the CRF analysis to the T-AO class Pumps and Fans (including motors & controllers), approximately 14% of the yearly maintenance is removed.



# ENGINEERING MAINTENANCE BRANCH BULLETIN



## Question of the Month: SAMM Preventive Maintenance Estimated Man Hours (From Randel Torfin, N711 Branch Chief)

### **Why do the Man Hour Estimates for SAMM Preventive Maintenance seem so low?**

The answer to this question goes back to the start of the SAMM system in 1985-1986. The maintenance in SAMM had to be balanced over a 12-month period. The estimated completion hours were used rather than number of maintenance actions per month because it more properly balanced the workload.

MSCHQ Engineering looked at the Navy 3M system and how they handled the issue. The U.S. Navy had contractors performing time motion studies for each maintenance action. This was an expensive method for MSC to determine completion hours and would severely impact the SAMM development budgets. It was decided that an “estimated” man-hour evaluation would be done with experienced mariners. These mariners include several Chief Engineers, First Assistant Engineers and Second Assistant Engineers with commercial experience that reviewed the maintenance for each ship. The evaluation criteria were borrowed from both industry and the Government. The estimated time is based on three criteria:

- The machine is in good condition, i.e. bolts are not rusted, gaskets not wasted away, etc.
- All necessary tools are at the machine
- The person(s) doing the maintenance have extensive experience with the machine and maintenance being performed

Notice that the time to go from the machine shop or the maneuvering platform to the machine is not included.

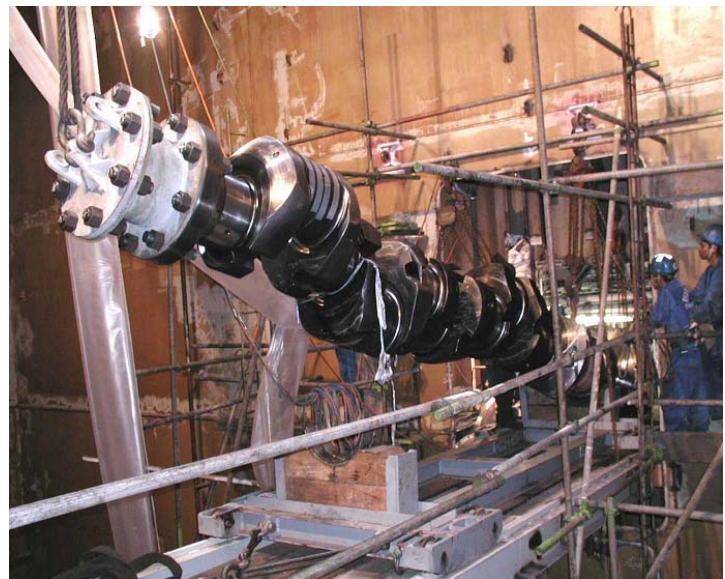
This was determined as too difficult to estimate without performing time motion studies.

As a backup measure, the SAMM system had the ability to input the hours when completing the maintenance each month. SAMM Version 1, 3 and 4 all had the capability. Unfortunately, very few ships entered the hours when completing maintenance. This would have helped to update the estimated hours with actual hours, which would have been averaged for each machine-PM in a class. Requests from the Fleet for removing the functionality lead to it being removed from subsequent SAMM versions.

---

## PICTURE OF THE MONTH Crankshaft Lifting out of Tanks

USNS PECOS – Crankshaft damaged by misaligned journal bearing is removed through 10 Center Cargo Tank during Port ME Overhaul, 2001.



(Courtesy of B. J. Goins, SEALOGPAC Port Engineer)



# ENGINEERING MAINTENANCE BRANCH BULLETIN

## CMEO Training – Come & Get It!

CMEO (Civilian Marine Engineering Officer) is a two-week training course (held quarterly) at the Naval Supply Corps School in Athens, GA. It is for both shipboard and shoreside engineers. The Engineering Directorate of the Military Sealift Command hosts the course and encourages all MSC engineers to attend (Note: MSC shipboard engineers are given priority when classes are full).

CMEO provides training on an array of topics such as: SAMM (MALIN, Logbook, etc.), Vibration Monitoring, Lube Oil, Fuel Oil (NEURS), Chemicals (boiler treatment, sewage treatment, etc.), Supply (COSAL, ShipCLIP), Environmental, and Safety. SAMM is interactively taught using actual data and each module is discussed extensively.

Upcoming CY '05 class dates:

- December 05-16, 2005

Upcoming CY '06 class dates:

- Jan 23-Feb 3, 2006
- April 17-28, 2006
- July 10-21, 2006
- December 04-15, 2006

For further information and to sign up, please go to the CMEO website (<http://63.219.124.12/cmeoclasssignup/cmeo.htm>), or contact Dave Greer ([david.greer1@navy.mil](mailto:david.greer1@navy.mil)) with any questions.



### NOW HEAR THIS!

*"Looks like the word is getting out... [The Bulletin] demonstrates more positive engineering information flow IRT PMAT initiatives." – R. McManus, Chief Engineer*

*"I just saw the latest PM newsletter (I like it!), and it prompted me to... request some DLI support on our sea trial next week." – J. Barlett, Chief Engineer*

Please pass on any and all Feedback from your Engine Department –. Feedback is *ESSENTIAL* to making this a helpful bulletin to all shipboard personnel in doing your job "smarter not harder". We do want this to be YOUR Maintenance Management Bulletin. What we don't want is to give you more junk mail. If there's a SAMM or Maintenance tip, topic, question, suggestion, or comment on how to make this useful, or something relating to Engineering Maintenance you think should get out to the ships, please pass it on. Send your submission to Randy Torfin ([randel.torfin@navy.mil](mailto:randel.torfin@navy.mil)) OR Norm Wolf ([norman.wolf@navy.mil](mailto:norman.wolf@navy.mil)).

## COMING UP FOR NEXT MONTH!

**Engineering Maintenance Web Portal!**

**Another SAMM/Maintenance Tip!**

**Another Question of the Month**

**More Picture(s) of the Month**

### N711 – Points of Contact:

Branch Chief – Randy Torfin, (202) 685-5744 ([Randel.Torfin@navy.mil](mailto:Randel.Torfin@navy.mil));

Sr. Mechanical Engineers – Will Carroll, (202) 685-5742 ([William.S.Carroll@navy.mil](mailto:William.S.Carroll@navy.mil)) & Norm Wolf, (202) 685-5778 ([norman.wolf@navy.mil](mailto:norman.wolf@navy.mil))

Mechanical Engineers – Liem Nguyen, (202) 685-5969 ([liem.nguyen@navy.mil](mailto:liem.nguyen@navy.mil)) & Andrew Shaw, (202) 685-5721 ([andrew.shaw@navy.mil](mailto:andrew.shaw@navy.mil));

Electrical Engineer – David Greer (202) 685-5738 ([David.Greer1@navy.mil](mailto:David.Greer1@navy.mil))